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Rectangular incisions were made averaging one-third of an inch in width and extending two inches lengthwise of the stem and of varying depth, some simply extending through the outer bark, others slightly into the woody fiber, and others to the heart of the stem.

The cut surfaces were speedily healed in the ordinary way, leaving the rectangular opening, and the sap which formerly flowed through the severed tissues was forced to find other channels.

When the incision extended only through the outer walls of tissue, an enlargement occurred at the upper end of the wound, being immediately at the sides of the cut, rather than above it, as would be the case if it were simply an enlargement resultant upon the severing of tissues, while when the incision extended deeper into the woody tissue this enlargement occurred at both the upper and the lower ends of the incision. Dissection and examination showed a slight increase in the amount of cellular tissue just surrounding the wound, as would be expected from the healing. Perhaps twenty plants were thus treated at the same time, always with the same result.

In other cases small splinters of wood, bits of wire and other foreign substances were forced into the stalk, and in such cases these substances were enfolded by the aggregation of a considerable amount of cellular tissue, or, in a manner, they would be encysted.

These few experiments, rude and incomplete from a strict scientific point of view, and undertaken when I had not time to follow them up as carefully as I could have wished, have yet yielded some curious results, and have suggested other experiments which shall be made during the coming year.

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## PERSONAL OBSERVATIONS UPON THE FLORA OF KANSAS.

BY MRS. A. L. SLOSSON, LEAVENWORTH.

The flora of Kansas has received considerable attention for some years, and many lists more or less comprehensive have been published. None of these even in the judgment of the compilers have been at all complete, and from the very necessities of the case, being more or less local, were limited in their range, and untrue in some of the general conclusions.

The location of Kansas being central, its vegetation partakes of the North and the South, of the fertile prairies of the East and the barren plains of the West; and though it may lack the plants that require the mountains for their home, yet our variety of soil gives us also a great variety of plants, and our long seasons and genial climate promote their growth. Our flora, moreover, is rapidly changing from various causes, among which are cultivation and the introduction of new plants, climatic changes, freedom from prairie fires, and the increase of timber and hedges.

It is a well-known fact that where the prairie sod is once destroyed it never reappears, but an entirely new and different vegetation comes, which is nearly the same in any given locality. An illustration of this that I never heard explained occurred after the last grasshopper raid in northern Kansas. The grasshoppers ate the grass to the roots in the fall, and in the spring kept it down until mid-summer, so that where it was trodden at all, as in yards, by the roadsides, and such places, it was entirely killed; even where it was blue-grass, that too shared the same fate; but late the next season the soil was covered thickly with a soft, low, pale grass unlike any that had ever been seen there before. The farmers called it "grasshopper grass,"

but when it seeded it was found to be identical with the buffalo grass, which at that time was abundant 150 miles west of there.

It is said the reason why the weeds thrive where our flowers die is "that the ground is mother to the weeds, and only stepmother to the flowers." If so, then Kansas is a very generous stepmother, for the readiness with which she adopts new plants is marvelous.

We all have seen the little circle of blue-grass spring up on the prairie where the prairie schooner dropped anchor for the night; and only give blue-grass or white clover plenty of rain and half a chance and either will utterly exterminate the native grasses.

Acres of cornfields have been rendered almost worthless by the well-known morning glory; let it once escape from cultivation and its persistence is worthy of imitation. The same may be said of the *Melilotus alba*, or sweet clover, which in the East is a tender plant and requires care, but here preëmpts and occupies fields and roadsides for miles and miles, making a perfect paradise for bees, and even takes possession of the railroad in such quantities that its fragrance is very perceptible to the passengers. Experience has taught me not to place implicit faith even upon Wood's Botany as to what plants are introduced, as once in a trip across the State, from the river to the Rocky Mountains, in a wagon, about seventy miles from the river a new flower was found, and upon analysis I named it *Cleome speciosissima* or spider flower, which is often cultivated for bee food as well as flowers, and as it is said to be a native of Mexico, it had escaped from cultivation; being near a town, it was the more probable; but the ridicule I endured was a thing to be remembered when in a journey of 1,000 miles we saw it at intervals, and in southern Colorado so abundant that a valley was so purple with it as to be called "Red Ravine." The same plant grew last year in Leavenworth, on the south esplanade, between the street and the river; whether native or escaped from cultivation, I do not know.

Another plant we first found upon the Blue river was one which is or was put down by Kansas botanists as introduced, and I had that summer left it growing from sale seeds in my garden — the *Argemone Mexicana*. Of course that had escaped; but when we found it day by day, until at the foot of the Sangre Cristo range there were whole acres of it, and other varieties and different colors not found in the Botany at all, that plant was added to the list, which daily grew longer, until if a *camellia* had been found upon the prairie, no one would have dared said "escaped from cultivation," or suggested that it was not a native — only a carpet-bagger.

The *Abronia umbeleta*, sold by florists, was found in the greatest profusion in our western counties; it is only less beautiful than the trailing *arbutus*, which it greatly resembles, yet I never saw it in a list of our plants, and it is accredited to the Pacific coast. The same is true of the hardy *verbena*, sold by florists under the name of *Verbena Montana*, yet it grew in the greatest beauty and fragrance only three counties west of us. I think it is identical with Wood's *Verbena aubletia*. Our Stateline is not so definitely marked upon our western frontier as at the eastern State line, yet I am very sure a very remarkable plant was native in our State at that time. The bush looks some like a willow clump, but it is not woody, and it bears in June and July immense flowers not unlike pumpkin blossoms in size and shape, but the color is reddish purple.

I first saw the plant in the Platte, beyond Kearney, but being on the cars could not obtain any. Its appearance was so peculiar I remembered it, and some time after Orange Judd gave a description and cut of it in the *Agriculturist*. He said the roots grew as large as a flour-barrel. Several years later, in 1878, I found it again near our western border, and identified it in Porter & Coulter's survey of Colorado, as *Ipomeal leptophylla*; but that says nothing of the root, and calls it an annual (with

a question-mark,) which it would not be likely to be with such a root. To make sure, I repeatedly spent my camping-time digging with such tools as I had, but several inches down failed to show any enlargement of the root, which was about the size of the stalk so far as I could go. At last some fellow-pilgrim left a spade in our way, and my brother attacked a very small plant and dug down perhaps six inches, and then it spread out like a jug with a long neck, and the whole root of that small plant was longer than a pail and nearly as large around in the center, of an irregular shape some like an immense yam. So my big-root theory was proved and the secret of its vigor revealed. That plant is ornamental, and will stand drouth, too.

For a long time I believed the common yarrow to be introduced, as the country had been settled at least ten years before I saw it, but my belief in that is shaken, as I never sent for flowers by friends, when they went to an unknown region, but they inevitably brought yarrow. I have had it sent from Texas, Utah, Pike's Peak and Long's Peak, Colorado, and at last from the Alps and Germany; so its nativity is very uncertain.

It is certain that vegetation near the Nebraska line was different when it was first settled from the central or southern part of the State, from what it is now, as many plants were very common that in some of the published lists were marked rare. It was my privilege to explore in the northern tier of counties before the Indians had left, and not long after the white men began to settle in Coronado's "land of crooked-backed oxen, mighty plains, and sandy heaths, smooth and wearisome, and where, too, the earth is strong and black, where were found prunes like those of Spain, excellent grapes, mulberries, and delightful flowers;" but no Botany was there except Mrs. Phelps's, based on the old system, and my knowledge of botany was very limited, and for ten years no other person was there at all interested in the study. However, it did not require technical knowledge to remember what flowers came first, what soil they grew on, or to mourn over the disappearance of some of the most rare, or to exult over the abundance and beauty everywhere displayed.

What landscape gardener, even in these days of massing color, dares dream of miles of phlox (Carolina), so nearly solid as to seem a mass of rose-pink? Yet the wide bottoms of the Nemaha presented just that view. With all the rage for yellow, has anyone imagined acres of rocky bluffs covered with the stately pentstemon (*Digitalis*), that one hour before sunset gave no hint of the coming glory, then almost at once burst out a solid mass of the gorgeous *enothera* (*Missouriensis*), every tint from the most delicate buff to an orange red, each bloom several inches across, and silky as a begonia? Go a little farther up to the prairie and you find different varieties of *enothera*—a long list, some white, some pink, some prostrate, and some four feet high.

Who can tell of the beauty in the fringe of timber when the wild crab, with its blush of pink, the plum with its mass of fragrant white, the grape with its tinted tassels of mignonette perfume, the weird red-bud (*Cercis Canadensis*), with its naked boughs hung with drops of bright crimson, when these displayed their banners over a carpet of violets, blue, white and yellow, growing beside the delicate *corydalis* (*Aurea*) and *dicentra* (*Cucullaria*), with here and there a stalk of early larkspur, or (*Del. Azuratum*) a mat of strangely mottled leaves bearing the lily-like *erythronium*, or the purple phlox (*Pilosa*)? No crazy-quilt or ribbon-bed in Shaw's garden was ever more brilliant than our autumn display of composite, asters, etc., daisies of all sizes and colors mingled with the stately *liatris* or royal purple of the ironweed (*Vernonia fasciculata*), with the electric blue of the *salvia* (*Aurea*), and the sunshine of the ever-present golden rod (*Solidago*).

As for sunflowers, our State was rightly named, for wherever the sod was broken by the wheel of the heavy freight wagons on the old California trail, there grew the

sunflower; wherever the track is laid for a railroad, there it grows. No wonder strangers passing through see nothing else. Call it gaudy, coarse and self-asserting if you will—it is persistent, hardy, bright, ever reaching upward and turning its face toward the light, and so is an emblem of a true Kansan. Long may it wave.

I have spoken thus of some of our flowers, as a mistaken idea is held by newcomers and dwellers in our towns. Not long ago a gentleman at the head of one of the finest schools in the State said our wild flowers would not compare with those of other States—New York for instance. Astonishment gave way to amusement when on inquiry it was found his research was confined to a portion of the country settled for thirty years and seeded with tame grasses. As well assert that there never were Indians in the State because there are very few now. I sincerely hope the time is not far distant when a systematic effort to preserve and cultivate our most valuable flowers will be made. It is worth it on the score of beauty, and desirable because they are adapted to our soil and climate. The florists of the Eastern cities do sell the seeds of perhaps a dozen sorts, but so change the name that only by personal observation can we identify the little waif whose name and pedigree were so laboriously ascertained when we met the nameless one at home on the prairie.

A lady once bought of Vick a dozen seeds of a beautiful foliage plant called "Snow on the Mountains," and succeeded in getting half a dozen, perhaps, to bloom just before frost, only to find that the bluffs back of her house for miles were just covered with the same flowers, and had been for three months. Yet it is well worthy of cultivation, and is very showy; grows on the banks of rivers all the way to the Smoky river, where it is very luxuriant and seems to enjoy the lack of rain. Its name is *Euphorbia marginata*, and it is own sister to the brilliant poinsetta, whose scarlet-velvet sprays are worth a dollar each at holidays. The *Asclepias tuberosa*, also known as pleurisy root and butterfly weed, is also sold, and is a brilliant, hardy perennial that stubbornly refuses to yield to the usurper, but sends its finely-folded, orange-red clusters defiantly up among the clover, under the apple trees, and even in the garden. Its root runs underground a long distance, and probably is not removed by the careless plow.

It is high time that as patriots who have the good name of our State at heart, that as scientists who deserve the credit of their research and desire others to share its benefits, this Society proceed to have issued in a cheap, available form a complete and descriptive list of our native and acquired flowers, so that our students who do not have access to large libraries can know where to place their specimens.

It is time some one began to cultivate our wild flowers, as soon some of them, like the Indian and buffalo, will be forever gone. Once the school children brought armfuls of the curious elkhorns, as they called them, or orchids (*Leucophea*)—now they are seldom seen; once the gentian, like a blue tulip, defied the late frosts, and bravely held up its cluster in the brown grass—now one may not see them in years. And so with others.

Thus grown together in some park, with a convenient list at hand, botany would possess new charms for our students, and teach them "to look up through nature to nature's God." It is said the undevout astronomer is mad; and it is equally true of the botanist, for the more we know of the wonderful structure of plants the more we are led to say: "Wonderful are thy works, O Lord God; in wisdom hast thou made them all," and to believe it is the part of true wisdom to "consider the lilies how they grow."